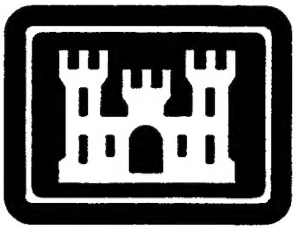
UMCS FEASIBILITY STUDY

FOR

Fort George G. Meade



US Army Corps
of Engineers

U.S. ARMY ENGINEER DISTRICT, BALTIMORE
CORPS OF ENGINEERS
BALTIMORE, MARYLAND

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ENTECH ENGINEERING INC.
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VOLUME 1 OF 3

DEPARTMENT OF THE ARMY
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS
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1.0 EXECUTIVE SUMMARY

1.1 Introduction

Fort George G. Meade selected eighty-three (83) buildings, from the approximately 1,500 buildings on the base to be included in the UMCS Feasibility Study. The purpose of the study is to evaluate the feasibility of replacing the existing analog based Energy Monitoring and Control System (EMCS) with a new distributed-process Monitoring and Control System (UMCS). Entech was authorized to perform this study by the following:

> Authorization: by memorandum, CEMP-ET, subject: "Energy Engineering Analysis Program (EEAP) - FY95", dated 29 December 1994.

1.2 Objective

The objective of this study, as explained in the brief Description of Work (Attachment 8.1 in Volume 2 of 3) of the contracts are as follows:

A. Review for general information the available design, construction, and operation data for the existing Energy Monitoring and Control System (EMCS).

B. Perform a limited site survey of selected buildings or facilities to verify construction features, electrical and mechanical equipment, occupancy, and mode of operation for energy analysis.

C. Evaluate the technical and economic feasibility of replacing the existing EMCS with a new, distributed-process monitoring and control system (UMCS).

D. Evaluate UMCS application programs (software) for all buildings or facilities using data from similar buildings to determine their energy

savings potential and economic feasibility for connection to the new UMCS.

E. Provide project documentation for recommended ECOs as detailed herein.

F. Prepare a comprehensive report to document all work performed, the results and all recommendations.

1.3 Report Organization

The study consists of three volumes. Volume 1 of 3 contains the study, Volume 2 of 3 contains the scope of work and the backup data, and Volume 3 of 3 contains the remainder of the back-up data. The following sections are contained within Volume 1 of 3:

A. Section 1 Executive Summary
B. Section 2 Methodology, describes in detail software and techniques used in the analysis.
C. Section 3 Facility Description, contains tables summarizing building characteristics and occupancy.
D. Section 4 Energy Costs, quantifies energy costs for electricity, natural gas, and fuel oil.
E. Section 5 Building by Building UMCS Analysis, contains energy calculations, construction costs, and Life Cycle Cost analysis on each building and a summary of all buildings together.
F. Section 6 Base UMCS Energy Conservation Opportunity (ECO), contains energy calculations, construction costs, and Life Cycle Costs analysis for buildings within the ECIP requirements as one ECO.
G. Section 7 Conclusion.

1.4 Facilities Description

Fort Meade is an administrative post for the Military District of Washington and provides a place for federal personnel to work and live. Fort Meade

provides a base operations to support tenant activities which include all service branches, Department of Defense activities and federal agencies. Fort Meade includes approximately fifteen hundred (1,500) buildings and encompasses 5,408 acres. Fort Meade houses numerous support facilities for education, administration, maintenance, medical, recreation, mercantile, and personal housing.

Section 3.0 provides information on each building included in the scope of this study in tabular form. The eighty-three buildings within the scope of this study have a total area of 2,645,816 square feet. Table 1.4.1 displays breakdown of floor space by building type.

Table 1.4.1
Building Inventory Statistics

Type	Area (s.f.)	No. Buildings	Average (s.f.)
Administrative	923,872	24	38,495
Housing	1,091,591	26	41,984
Maintenance	65,769	8	8,221
Mercantile	229,903	7	32,843
Storage	29,909	2	14,955
Housing Support	304,772	16	19,048
Total	2,645,816	83	31,877

1.5 Energy Costs

The following energy costs were derived from actual Fort Meade energy bills. Refer to Section 4.0 for how these costs were arrived at.

Table 1.5.1 Base Energy Cost		
Fuel Type	**Cost $/unit**	**$/mmBtu**
Electric Usage	$0.032 / kWh	$9.38
Electric Demand	$96.28 / year	---
Natural Gas	$3.97 / mcf	$3.85
Fuel Oil	$0.62 / gallon	$4.47

1.6 Building by Building Analysis

Each building was evaluated individually. Central strategies were developed for each building. Control point counts and energy savings were developed based on the control strategies. The control strategies and point counts were based on the Army Energy Monitoring and Control System technical manual TM5-815-2. The annual energy savings were developed using the Energy Savings Analysis (ESA) and EZDOE energy simulation programs. Each of these programs are described in Section 2.4 and 2.5 of this study. Then a construction cost to implement the control strategies and points was estimated using the draft edition of the UMCS Cost Estimator program. The final step was to run a Life Cycle Cost analysis in order to determine the savings to investment ratio (SIR) of each building.

Table 1.6.1 summarizes each building's point total, energy savings, construction costs and investment. A life cycle cost analysis was calculated for all eighty-three buildings added together. Using a total construction cost of $3,484,180 and saving of $582,770 for all 83 building, the SIR for all buildings as one project is 1.47 with a simple payback of 5.97 years.

TABLE 1.6.1
UMCS FEASIBILITY STUDY
FORT MEADE
DISTRIBUTED-PROCESS MONITOR AND CONTROL SYSTEMS (UMCS)
SYSTEMS SUMMARY ECONOMICS ANALYSIS

Building	Number of Points	Savings			First Costs				Investment	
		mmBtu	Dollar $	EMCS Maintenance $	Construction Cost $	SIOH $	Design Cost $	Building Total $	SIR	Simple Payback (years)
370	43	388	$2,400	$2,460	$32,450	$1,780	$1,950	$36,180	1.14	7.42
375	9	107	$800		$7,970	$440	$480	$8,890	0.76	11.49
393	12	533	$3,500		$5,960	$330	$360	$6,650	4.51	1.92
504	5	382	$2,700	$730	$4,570	$250	$270	$5,090	5.67	1.49
909	63	785	$5,900		$53,700	$2,950	$3,220	$59,870	0.84	10.21
940	16	489	$2,500	$730	$8,240	$450	$490	$9,180	3.24	2.81
1978 1976	58	1,601	$11,500		$68,080	$3,740	$4,080	$75,900	1.29	6.61
2212	40	176	$2,000	$730	$26,820	$1,480	$1,610	$29,910	0.74	11.02
2220	26	489	$3,500	$860	$18,830	$1,040	$1,130	$21,000	1.79	4.81
2234	34	799	$6,000	$980	$45,960	$2,530	$2,760	$51,250	1.14	7.38
2251		0	$0							
2253	6	305	$1,900	$370	$4,110	$230	$250	$4,590	4.32	1.98
2257	62	2,039	$11,300	$980	$79,470	$4,370	$4,770	$88,610	1.21	7.24
2282	39	350	$2,700		$48,170	$2,650	$2,890	$53,710	0.43	19.57
2481	22	718	$5,000	$1,110	$16,670	$920	$1,000	$18,590	2.87	3.03
2482	39	556	$2,800		$264,910	$14,570	$15,890	$295,370	0.09	104.26
2484	21	565	$3,900		$19,380	$1,070	$1,160	$21,610	1.59	5.51
2490	45	4,996	$24,000		$52,420	$2,880	$3,150	$58,450	3.92	2.42
2501	55	201	$2,300	$370	$32,140	$1,770	$1,930	$35,840	0.61	13.54
2786	42	1,756	$10,700		$43,140	$2,370	$2,590	$48,100	1.94	4.50
2789	40	378	$3,300	$1,350	$44,260	$2,430	$2,660	$49,350	0.78	10.60
2790	100	4,065	$21,600	$5,160	$45,810	$2,520	$2,750	$51,080	4.63	1.91
2793		0	$0							
2812	12	98	$800	$250	$15,270	$840	$920	$17,030	0.53	15.99
3000	12	497	$2,400		$11,210	$620	$670	$12,500	1.75	5.25
4215	42	2,174	$12,000	$1,230	$58,470	$3,220	$3,510	$65,200	1.76	4.98
4216	35	872	$5,200	$730	$47,200	$2,600	$2,830	$52,630	0.98	8.81
4217	42	900	$5,200	$620	$53,970	$2,970	$3,240	$60,180	0.84	10.40
4411	86	4,074	$25,800	$1,230	$81,230	$4,470	$4,870	$90,570	2.58	3.35
4418	27	69	$700	$860	$32,670	$1,800	$1,960	$36,430	0.34	24.41
4419	67	687	$4,400	$980	$43,020	$2,370	$2,580	$47,970	0.98	8.86
4431	18	240	$1,600	$980	$22,060	$1,210	$1,320	$24,590	0.88	9.65
4432	55	1,146	$6,800	$1,720	$56,860	$3,130	$3,410	$63,400	1.16	7.46
4471	9	87	$900	$980	$4,340	$240	$260	$4,840	3.22	2.58
4550	151	8,973	$46,500	$5,410	$150,320	$8,270	$9,020	$167,610	2.75	3.23
4551	75	865	$5,000	$1,110	$66,110	$3,640	$3,970	$73,720	0.73	12.04
4552	91	3,145	$21,200	$4,430	$65,430	$3,600	$3,930	$72,960	2.99	2.84
4553	137	8,414	$47,800	$6,900	$118,130	$6,500	$7,090	$131,720	3.63	2.41

4471	9	87	$900	$980	$4,340	$240	$260	$4,840	3.22	2.58
4550	151	8,973	$46,500	$5,410	$150,320	$8,270	$9,020	$167,610	2.75	3.23
4551	75	865	$5,000	$1,110	$66,110	$3,640	$3,970	$73,720	0.73	12.04
4552	91	3,145	$21,200	$4,430	$65,430	$3,600	$3,930	$72,960	2.99	2.84
4553	137	8,414	$47,800	$6,900	$118,130	$6,500	$7,090	$131,720	3.63	2.41
4554	154	10,117	$57,500	$5,160	$117,930	$6,490	$7,080	$131,500	4.18	2.10
4587	20	256	$1,400		$11,000	$610	$660	$12,270	1.07	8.70
4675	8	49	$600		$5,700	$310	$340	$6,350	0.77	10.59
4680	16	84	$600	$500	$27,360	$1,500	$1,640	$30,500	0.31	27.68
4700	50	1,154	$5,300	$4,060	$38,720	$2,130	$2,320	$43,170	1.89	4.62
4703 4704 4717 4720 4721	72	489	$2,600	$1,720	$84,210	$4,630	$5,050	$93,890	0.40	21.52
4705 4707 4709	72	411	$1,700	$1,110	$73,530	$4,040	$4,410	$81,980	0.37	23.59
6330	28	4,515	$20,400	$1,600	$32,900	$1,810	$1,970	$36,680	5.47	1.66
6530	61	1,956	$9,000	$1,720	$54,390	$2,990	$3,260	$60,640	1.59	5.66
6600	127	2,110	$13,900	$500	$101,420	$5,580	$6,090	$113,090	1.10	7.83
6800	20	147	$1,400		$11,640	$640	$700	$12,980	0.94	9.20
7100	27	856	$4,200	$860	$33,490	$1,840	$2,010	$37,340	1.21	7.40
8452	65	1,525	$7,800	$2,830	$53,990	$2,970	$3,240	$60,200	1.55	5.68
8465	36	364	$1,900	$860	$40,070	$2,200	$2,400	$44,670	0.55	15.98
8472	30	419	$2,200	$980	$29,260	$1,610	$1,760	$32,630	0.84	10.41
8476	12	110	$1,000	$500	$8,690	$480	$520	$9,690	0.87	9.68
8477	12	110	$1,000		$11,650	$640	$700	$12,990	0.96	8.65
8478 8479 8544 8545 8605 8607 8609 8610 8611	207	4,470	$20,700	$8,260	$222,990	$12,260	$13,380	$248,630	1.04	8.59
8481	33	730	$3,100		$221,270	$12,170	$13,280	$246,720	0.12	78.47
8485 8486	8	227	$1,000		$3,380	$190	$200	$3,770	19.34	0.50
8606	23	498	$2,300	$1,350	$25,580	$1,410	$1,530	$28,520	1.13	7.81
9801 9802 9803 9804	76	106	$3,800	$3,940	$91,480	$5,030	$5,490	$102,000	0.61	13.26
9810	65	1,656	$7,900	$2,210	$53,240	$2,930	$3,190	$59,360	1.72	5.13
9827	25	389	$1,800		$5,910	$330	$350	$6,590	2.52	3.66
9828	25	738	$3,700		$5,280	$290	$320	$5,890	5.63	1.61
9829	18	1,770	$7,700	$250	$10,370	$570	$620	$11,560	6.39	1.45
TOTALS	2,926	89,175	$501,100	$81,670	$3,124,800	$171,900	$187,480	$3,484,180	1.47	5.97

TABLE 1.6.1
UMCS FEASIBILITY STUDY
FORT MEADE
DISTRIBUTED-PROCESS MONITOR AND CONTROL SYSTEMS (UMCS)
SYSTEMS SUMMARY ECONOMICS ANALYSIS

Building	Number of Points	Savings			First Costs				Investment	
		mmBtu	Dollar $	EMCS Maintenance $	Construction Cost $	SIOH $	Design Cost $	Building Total $	SIR	Simple Payback (years)
8485	8	227	$1,020		$3,380	$190	$200	$3,770	19.34	0.50
8486										
9829	18	1,770	$7,720	$250	$10,370	$570	$620	$11,560	6.39	1.45
504	5	382	$2,680	$730	$4,570	$250	$270	$5,090	5.67	1.49
9828	25	738	$3,660		$5,280	$290	$320	$5,890	5.63	1.61
6330	28	4,515	$20,420	$1,600	$32,900	$1,810	$1,970	$36,680	5.47	1.66
2790	100	4,065	$21,640	$5,160	$45,810	$2,520	$2,750	$51,080	4.63	1.91
393	12	533	$3,450		$5,960	$330	$360	$6,650	4.51	1.92
2253	6	305	$1,940	$370	$4,110	$230	$250	$4,590	4.32	1.98
4554	154	10,117	$57,510	$5,160	$117,930	$6,490	$7,080	$131,500	4.18	2.10
2490	45	4,996	$24,010		$52,420	$2,880	$3,150	$58,450	3.92	2.42
4553	137	8,414	$47,800	$6,900	$118,130	$6,500	$7,090	$131,720	3.63	2.41
940	16	489	$2,530	$730	$8,240	$450	$490	$9,180	3.24	2.81
4471	9	87	$890	$980	$4,340	$240	$260	$4,840	3.22	2.58
4552	91	3,145	$21,190	$4,430	$65,430	$3,600	$3,930	$72,960	2.99	2.84
2481	22	718	$5,000	$1,110	$16,670	$920	$1,000	$18,590	2.87	3.03
4550	151	8,973	$46,500	$5,410	$150,320	$8,270	$9,020	$167,610	2.75	3.23
4411	86	4,074	$25,770	$1,230	$81,230	$4,470	$4,870	$90,570	2.58	3.35
9827	25	389	$1,790		$5,910	$330	$350	$6,590	2.52	3.66
2786	42	1,756	$10,680		$43,140	$2,370	$2,590	$48,100	1.94	4.50
4700	50	1,154	$5,290	$4,060	$38,720	$2,130	$2,320	$43,170	1.89	4.62
2220	26	489	$3,500	$860	$18,830	$1,040	$1,130	$21,000	1.79	4.81
4215	42	2,174	$12,030	$1,230	$58,470	$3,220	$3,510	$65,200	1.76	4.98
3000	12	497	$2,380		$11,210	$620	$670	$12,500	1.75	5.25
9810	65	1,656	$7,860	$2,210	$53,240	$2,930	$3,190	$59,360	1.72	5.13
2484	21	565	$3,910		$19,380	$1,070	$1,160	$21,610	1.59	5.51
6530	61	1,956	$8,990	$1,720	$54,390	$2,990	$3,260	$60,640	1.59	5.66
8452	65	1,525	$7,770	$2,830	$53,990	$2,970	$3,240	$60,200	1.55	5.68
1978	58	1,601	$11,460		$68,080	$3,740	$4,080	$75,900	1.29	6.61
1976			369,390	46,920				1,279,910	53	3.07
2257	62	2,039	$11,250	$980	$79,470	$4,370	$4,770	$88,610	1.21	7.24
7100	27	856	$4,180	$860	$33,490	$1,840	$2,010	$37,340	1.21	7.40
4432	55	1,146	$6,770	$1,720	$56,860	$3,130	$3,410	$63,400	1.16	7.46
2234	34	799	$5,950	$980	$45,960	$2,530	$2,760	$51,250	1.14	7.38
2251		0	$0							
370	43	388	$2,420	$2,460	$32,450	$1,780	$1,950	$36,180	1.14	7.42
8606	23	498	$2,300	$1,350	$25,580	$1,410	$1,530	$28,520	1.13	7.81
6600	127	2,110	$13,920	$500	$101,420	$5,580	$6,090	$113,090	1.10	7.83

2251		0	$0							
370	43	388	$2,420	$2,460	$32,450	$1,780	$1,950	$36,180	1.14	7.42
8606	23	498	$2,300	$1,350	$25,580	$1,410	$1,530	$28,520	1.13	7.81
6600	127	2,110	$13,920	$500	$101,420	$5,580	$6,090	$113,090	1.10	7.83
4587	20	256	$1,400		$11,000	$610	$660	$12,270	1.07	8.70
8478	207	4,470	$20,680	$8,260	$222,990	$12,260	$13,380	$248,630	1.04	8.59
8479 8544 8545 8605 8607 8609 8610 8611 4216	35	872	$5,240	$730	$47,200	$2,600	$2,830	$52,630	0.98	8.81
4419	67	687	$4,430	$980	$43,020	$2,370	$2,580	$47,970	0.98	8.86
8477	12	110	$1,000		$11,650	$640	$700	$12,990	0.96	8.65
6800	20	147	$1,410		$11,640	$640	$700	$12,980	0.94	9.20
4431	18	240	$1,570	$980	$22,060	$1,210	$1,320	$24,590	0.88	9.65
8476	12	110	$1,000	$500	$8,690	$480	$520	$9,690	0.87	9.68
909	63	785	$5,860		$53,700	$2,950	$3,220	$59,870	0.84	10.21
4217	42	900	$5,160	$620	$53,970	$2,970	$3,240	$60,180	0.84	10.40
8472	30	419	$2,160	$980	$29,260	$1,610	$1,760	$32,630	0.84	10.41
2789	40	378	$3,300	$1,350	$44,260	$2,430	$2,660	$49,350	0.78	10.60
4675	8	49	$600		$5,700	$310	$340	$6,350	0.77	10.59
375	9	107	$770		$7,970	$440	$480	$8,890	0.76	11.49
2212	40	176	$1,980	$730	$26,820	$1,480	$1,610	$29,910	0.74	11.02
4551	75	865	$5,010	$1,110	$66,110	$3,640	$3,970	$73,720	0.73	12.04
9801 9802 9803 9804	76	106	$3,750	$3,940	$91,480	$5,030	$5,490	$102,000	0.61	13.26
2501	55	201	$2,260	$370	$32,140	$1,770	$1,930	$35,840	0.61	13.54
8465	36	364	$1,930	$860	$40,070	$2,200	$2,400	$44,670	0.55	15.98
2812	12	98	$820	$250	$15,270	$840	$920	$17,030	0.53	15.99
2282	39	350	$2,740		$48,170	$2,650	$2,890	$53,710	0.43	19.57
4703 4704 4717 4720 4721	72	489	$2,640	$1,720	$84,210	$4,630	$5,050	$93,890	0.40	21.52
4705 4707 4709	72	411	$1,720	$1,110	$73,530	$4,040	$4,410	$81,980	0.37	23.59
4418	27	69	$660	$860	$32,670	$1,800	$1,960	$36,430	0.34	24.41
4680	16	84	$600	$500	$27,360	$1,500	$1,640	$30,500	0.31	27.68
8481	33	730	$3,140		$221,270	$12,170	$13,280	$246,720	0.12	78.47
2482	39	556	$2,820		$264,910	$14,570	$15,890	$295,370	0.09	104.26
2793		0	$0							
TOTALS	2,926	89,175	$500,830	$81,670	$3,124,800	$171,900	$187,480	$3,484,180	1.47	5.97

1.7 Recommended UMCS Energy Conservation Opportunity (ECO)

For the Base UMCS ECO to qualify for ECIP funding, each individual building of the ECO must have an SIR greater than 1.25. Of the eighty-three (83) buildings included in the study only thirty (30) buildings have an SIR greater than 1.25.

These thirty (30) buildings were grouped together to form the recommended UMCS Energy Conservation Opportunity. Table 1.7.1 summarizes these thirty buildings. The construction cost for the buildings changed slightly due to system wide UMCS costs that remain the same even though most of the buildings costs were eliminated. Refer to Section 6.2 and Attachment 8.4 for a detailed construction cost breakdown.

A Life Cycle Cost analysis was calculated for all thirty buildings as one recommended ECO. Using the ECO construction cost of $1,429,630 and saving total of $434,900, the SIR for these thirty buildings is 2.65 with a corresponding simple payback of 3.33 years. By eliminating buildings which have an individual SIR less than 1.25, the total SIR greatly increased.

This suggested, the UMCS ECO has a total point count of 1,380 points. This point count and the construction cost of $1,429,630 translates to a dollar per point cost of $1,036/pt. Industry costs range from $800/pt to $1,200/pt. This places the UMCS cost at the middle of the range, which means the UMCS costs are reasonable.

Of the eighty-three (83) buildings included in the study only 36% of the buildings met the required criteria to be included in the recommended UMCS ECO. The recommended ECO includes most of the major buildings on the base. The eighty-three (83) buildings represent a total area of 2,645,816 square feet. The thirty (30) buildings in the recommended UMCS ECO represent a total area of 1,326,781 square feet, which accounts for 50% of the total area studied. These thirty (30) buildings will provide Fort Meade with a good system to build on in the future. Once the UMCS system is installed, buildings that are renovated and not already on the system can be readily added to the system.

It is not surprising that the thirty buildings finally selected to be included within the recommended ECO tend to be the larger; more mechanically intensive, facilities offering the type of energy saving opportunities that justify the expense of installing a new UMCS system. The remaining facilities are small facilities with elementary mechanical system offering little opportunities for any substantial energy savings.

The following sections of this study describe in detail the findings as outlined above and contain the necessary energy and cost estimate backup data as required. The reader is encouraged to carefully review each of the following study sections to understand the assumptions, methodology and discussions involved.

TABLE 1.7.1
UMCS FEASIBILITY STUDY
FORT MEADE
DISTRIBUTED-PROCESS MONITOR AND CONTROL SYSTEMS (UMCS)
SYSTEMS SUMMARY ECONOMICS ANALYSIS

Building	Building Usage	Number of Points	Savings			First Costs			
			mmBtu	Dollar $	EMCS Maintenance $	Construction Cost $	SIOH $	Design Cost $	Building Total $
393	Administrative	12	533	$3,450		$6,570	$360	$390	$7,320
504	Training Aide Center	5	382	$2,680	$690	$7,780	$430	$470	$8,680
940	Morale Support Office	16	489	$2,530	$690	$12,000	$660	$720	$13,380
1978 1976	Administrative Warehouse	58	1,601	$11,460		$71,020	$3,910	$4,260	$79,190
2220	Guided Missile Maintenance Facility	26	489	$3,500	$810	$20,780	$1,140	$1,250	$23,170
2253	DS Vehicle Maintenance Shop	6	305	$1,940	$350	$4,410	$240	$260	$4,910
2481	Unaccompanied Enlisted Personnel Housing	22	718	$5,000	$1,050	$17,770	$980	$1,070	$19,820
2484	Medical Supply Warehouse	21	565	$3,910		$20,440	$1,120	$1,230	$22,790
2490	Laboratory	45	4,996	$24,010		$54,680	$3,010	$3,280	$60,970
2786	Commissary	42	1,756	$10,680		$45,260	$2,490	$2,720	$50,470
2790	Main Exchange, Retail	100	4,065	$21,640	$4,900	$50,840	$2,800	$3,050	$56,690
3000	FE Facility	12	497	$2,380		$11,820	$650	$710	$13,180
4215	Administrative	42	2,174	$12,030	$1,160	$60,590	$3,330	$3,640	$67,560
4411	Administrative	86	4,074	$25,770	$1,160	$85,560	$4,710	$5,130	$95,400
4471	Credit Union	9	87	$890	$930	$7,770	$430	$470	$8,670
4550	Administrative	151	8,973	$46,500	$5,130	$157,930	$8,690	$9,480	$176,100
4552	Administrative	91	3,145	$21,190	$4,200	$70,010	$3,850	$4,200	$78,060
4553	Administrative	137	8,414	$47,800	$6,550	$125,030	$6,880	$7,500	$139,410
4554	Administrative	154	10,117	$57,510	$4,900	$125,690	$6,910	$7,540	$140,140
4700	Band Training Facility	50	1,154	$5,290	$3,840	$41,240	$2,270	$2,470	$45,980
6330	Physical Fitness Center	28	4,515	$20,420	$1,520	$34,310	$1,890	$2,060	$38,260
6530	Skill Development Center	61	1,956	$8,990	$1,640	$57,460	$3,160	$3,450	$64,070
8452	Administrative	65	1,525	$7,770	$2,680	$58,170	$3,200	$3,490	$64,860
8485 8486	ORG Vehicle Maintenance Shop ORG Vehicle Maintenance Shop	8	227	$1,020		$7,220	$400	$430	$8,050
9810	Recreation Center	65	1,656	$7,860	$2,110	$56,510	$3,110	$3,390	$63,010
9827	Unaccompanied Enlisted Personnel Housing	25	389	$1,790		$7,160	$390	$430	$7,980
9828	Unaccompanied Enlisted Personnel Housing	25	738	$3,660		$6,530	$360	$390	$7,280
9829	Enlisted Personnel Dining	18	1,770	$7,720	$240	$11,270	$620	$680	$12,570
TOTALS		1,380	67,309	$369,390	$44,550	$1,235,820	$67,990	$74,160	$1,377,970

SIR	2.65
Simple Payback (years)	3.33